

It is claimed:

1 1. A method of recording a digital signal and an analog signal, comprising:
2 sampling said analog signal to form a first set of discrete analog samples;
3 storing said first set of discrete analog samples into a first set of respective cells of a
4 memory array;
5 converting said digital signal into a continuous-time analog signal;
6 sampling said continuous-time analog signal to form a second set of discrete analog
7 samples; and
8 storing said second set of discrete analog samples into a second set of respective cells
9 of said memory array.

1 2. The method of claim 1, wherein converting said digital signal into a
2 continuous-time analog signal comprises:
3 generating a pulse-width modulated signal whose duty cycle depends on respective
4 sample levels of said digital signal; and
5 filtering said pulse-width modulated signal to form said continuous-time analog
6 signal.

1 3. The method of claim 2, wherein converting said digital signal into a
2 continuous-time analog signal further comprises reducing a sampling resolution of said digital
3 signal prior to generating said pulse-width modulated signal.

1 4. The method of claim 1, further comprising decompressing said digital signal
2 prior to converting said digital signal into a continuous-time analog signal.

1 5. A method of generating a digital signal and an analog signal, comprising:
2 retrieving a first set of discrete analog samples from a memory array;
3 filtering said first set of discrete analog samples to generate said analog signal;
4 retrieving a second set of discrete analog samples from said memory array;
5 filtering said second set of discrete analog samples to generate a continuous-time
6 analog signal; and
7 converting said continuous-time analog signal into said digital signal.

1 6. The method of claim 5, wherein converting said continuous-time analog
2 signal into said digital signal comprises:

3 generating discrete samples of said continuous-time analog signal; and
4 generating a pulse-width modulated signal whose duty cycle respectively depends on
5 the amplitude of said discrete samples of said continuous-time analog signal; and
6 digitizing the pulse-width modulated signal.

1 7. The method of claim 6, wherein generating discrete samples of said
2 continuous-time analog signal comprises generating said discrete samples that comprises an
3 average voltage of said continuous-time analog signal between respective samples.

1 8. The method of claim 5, further comprising increasing a sampling resolution
2 of said digital signal.

1 9. The method of claim 5, further comprising compressing said digital signal.

1 10. A method of recording a digital signal, comprising:
2 converting said digital signal into a continuous-time analog signal;
3 sampling said continuous-time analog signal to form a plurality of discrete analog
4 samples; and
5 storing said plurality of discrete analog samples into respective cells of a memory
6 array.

1 11. The method of claim 10, wherein converting said digital signal into a
2 continuous-time analog signal comprises:
3 generating a pulse-width modulated signal whose duty cycle depends on respective
4 sample levels of said digital signal; and
5 filtering said pulse-width modulated signal to form said continuous-time analog
6 signal.

1 12. The method of claim 11, wherein converting said digital signal into a
2 continuous-time analog signal further comprises reducing a sampling resolution of said digital
3 signal prior to generating said pulse-width modulated signal.

1 13. The method of claim 11, further comprising decompressing said digital signal
2 prior to converting said digital signal into a continuous-time analog signal.

1 14. A method of generating a digital signal, comprising:
2 retrieving a plurality of discrete analog samples from a memory array;
3 generating a continuous-time analog signal from said plurality of said discrete analog
4 samples; and
5 converting said continuous-time analog signal into said digital signal.

1 15. The method of claim 14, wherein converting said continuous-time analog
2 signal into said digital signal comprises:
3 generating discrete samples of said continuous-time analog signal; and
4 generating a pulse-width modulated signal whose duty cycle respectively depends on
5 the amplitude of said discrete samples of said continuous-time analog signal.

1 16. The method of claim 15, wherein generating discrete samples of said
2 continuous-time analog signal comprises generating said discrete samples that comprises an
3 average voltage of said continuous-time analog signal between respective samples.

1 17. The method of claim 14, further comprising increasing a sampling resolution
2 of said digital signal.

1 18. The method of claim 14, further comprising compressing said digital signal.

1 19.. An analog/digital recording system, comprising:
2 a memory array;
3 a converter to convert a digital signal into a continuous-time analog signal; and
4 a programming device to generate a first set of discrete analog samples of said
5 continuous-time analog signal and to store said first set of discrete analog samples into said
6 memory array, and to generate a second set of discrete analog samples from an input analog
7 signal and to store said second set of discrete analog samples into said memory array.

1 20. The analog/digital recording system of claim 19, wherein said converter
2 comprises:

3 a digital demodulator to generate a pulse-width modulated signal whose duty cycle
4 depends on respective sample levels of said digital signal; and
5 a filter to filter said pulse-width modulated signal to form said continuous-time
6 analog signal.

1 21. The analog/digital recording system of claim 20, wherein said converter
2 further comprises a digital smoothing interpolation filter to reduce a sampling resolution of
3 said digital signal.

1 22. The analog/digital recording system of claim 19, further comprising an
2 expander to decompress said digital signal prior to converting said digital signal into a
3 continuous-time analog signal.

1 23. An analog/digital playback system, comprising:
2 a memory array to store first and second sets of analog samples;
3 a reading device to retrieve said first and second sets of analog samples and to
4 generate first and second continuous-time analog signals respectively from said first and
5 second sets of analog samples; and
6 a converter to convert said first continuous-time analog signal into a digital signal.

1 24. The analog/digital playback system of claim 23, wherein said converter
2 comprises:

3 a switch capacitor amplifier to generate discrete samples of said continuous-time
4 analog signal; and
5 an analog modulator to generate a pulse-width modulated signal whose duty cycle
6 depends on the amplitude of respective discrete samples of said continuous-time analog
7 signal.

1 25. The analog/digital playback system of claim 24, further comprising a digital
2 anti-aliasing decimation filter to increase a sampling resolution of said digital signal.

1 26. The analog/digital playback system of claim 23, further comprising a
2 compressor to compress said digital signal.

1 27. A digital recording system, comprising:
2 a memory array;
3 a converter to convert a digital signal into a continuous-time analog signal; and
4 a programming device to generate discrete analog samples of said continuous-time
5 analog signal and to store said discrete analog samples into said memory array.

1 28. The analog/digital recording system of claim 27, wherein said converter
2 comprises:
3 a digital demodulator to generate a pulse-width modulated signal whose duty cycle
4 depends on respective sample levels of said digital signal; and
5 a filter to filter said pulse-width modulated signal to form said continuous-time
6 analog signal.

1 29. The analog/digital recording system of claim 28, wherein said converter
2 further comprises a digital smoothing interpolation filter to reduce a sampling resolution of
3 said digital signal.

1 30. The analog/digital recording system of claim 27, further comprising an
2 expander to decompress said digital signal prior to converting said digital signal into a
3 continuous-time analog signal.

1 31. A digital playback system, comprising:
2 a memory array to store a plurality of analog samples;
3 a reading device to retrieve said plurality of analog samples and to generate a
4 continuous-time analog signal from said plurality of analog samples; and
5 a converter to convert said continuous-time analog signal into a digital signal.

1 32. The analog/digital playback system of claim 31, wherein said converter
2 comprises:
3 a switch capacitor amplifier to generate discrete samples of said continuous-time
4 analog signal; and

5 an analog modulator to generate a pulse-width modulated signal whose duty cycle
6 depends on the amplitude of respective discrete samples of said continuous-time analog
7 signal.

1 33. The analog/digital playback system of claim 31, further comprising a digital
2 anti-aliasing decimation filter to increase a sampling resolution of said digital signal.

1 34. The analog/digital playback system of claim 31, further comprising a
2 compressor to compress said digital signal.